Winter 1990

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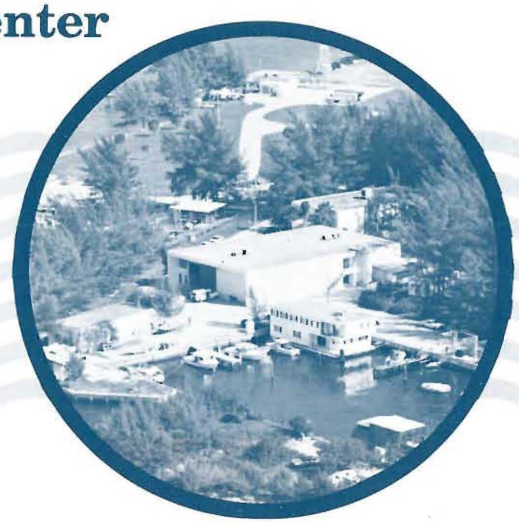
NSU Oceanographic Center

Nova University Oceanographic Center

Currents



Winter 1990 Volume IV Number 1

A SEA TURTLE SUCCESS STORY

The hatching results for the 1989 Sea Turtle Conservation Project for Broward County, Florida, are now in. The principal investigator for the project was **Dr. Curtis Burney**, and the person who organized the survey teams and trudged the beaches at dawn each day for almost five months was project manager **Cathy Mattison** (a familiar name by now).

Most statistics are dull, mind-bending, and tend toward the inconsequential. The following figures, in our modest opinion, are none of the above.

Cathy Mattison and Dr. Curtis Burney, in front of sea turtle display.

We will start with the most important number: 69% of the hatchlings from relocated nests in Broward County survived the ordeal and made it to the sea. That may not seem like very good survival odds, but consider this: if these particular nests had not been relocated, many more eggs would have been lost due to seawater flooding, beach cleaning operations, or predation, and thousands of hatchlings would have been disoriented by beach front lights and never reached the sea.

To put this success rate in the proper perspective, picture 1,695 sea turtle nests stretched out on Broward County's beaches, from Hillsboro all the way south to Hollywood. Of these, try to isolate the 1,392 nests that were considered endangered for any of several reasons and were relocated - physically moved to safer sites on the beach. Then, 60 days later, 108.7 (average number of eggs per relocated nest) tiny dark heads emerge from each swarming nest and make their tipsy way to the sparkling sea. And so, amazingly, of the 151,952 relocated eggs, 104,622 actually have survived.

You may wonder what happened to the 47,330 eggs that did not produce healthy sea turtles. Our study determined that 2,198 eggs were either destroyed by predation (mostly by foxes and raccoons) or lost (primarily due to missing nest markers). The balance of the eggs either were unfertilized or produced sea turtles with arrested development.

Studies such as this one always attract criticism to the effect that handling the fragile sea turtle eggs during the relocation process can damage the hatchlings. Happily, our group found no evidence that relocating the nests in any way decreases the hatching success. In fact, using a control group of 99 natural (unrelocated) nests, it was found that these nests produced only a 66.7% hatching success rate (compared with 69% for the relocated nests). According to Dr. Burney, the hatching success rate, although encouraging, is lower than that of previous years. Major factors affecting this rate may have been the temperature anomalies that South Florida experienced in 1989, or perhaps the extremely dry weather that was prevalent during the same period. Perhaps both.

For those who cannot get enough of statistics, of the 1,695 sea turtle nests laid in Broward County in 1989, 1,670 belonged to loggerheads, 21 to green sea turtles, and 4 to leatherbacks. All are endangered. The project encountered 1,386 false crawls, which included crawls and then returns to the sea, as well as excavations without nests.

Moon Over The County

Dr. Curtis Burney, principal investigator of the Broward County Sea Turtle Conservation Project, feels that the moon has a definite effect on sea turtle nesting activity. "Full moons and new moons seem to have higher than average nesting times," he contends. Based on the county-wide data gathered during this project, there was a higher number of nests per day during periods of full and new moons, compared with periods of first- and third-quarter moons.

"It's got to have something to do with the tides, or tidal currents," Dr. Burney continues. "It could be that a turtle senses gravitational anomalies. It is clearly not light, because increased nesting happens not only on the full moon, but on the new moon as well."

In 1988 Nova's sea turtle nesting project covered Hillsboro Beach to the north. Dr. Burney's findings hold true for that study as well. "It also holds for false crawls" (the crawls up the sand that, for reasons known only to female sea turtles, are abandoned without nesting). "We hope to look further into this question. I think it will be a function of both the timing and the high tide - when high tide comes at night. Whoever handles sea turtles in the future shouldn't be surprised if they are deluged by nests during these times."

Dr. Burney is encouraged by the consistency of the data. "A lot of these turtle projects save sea turtles but don't generate useful data. But this project does show certain relationships. It tells us something totally independent, which shows us that the data base is good - it has generated useful data. That's what makes it ecology," he concludes. "Otherwise it's just conservation."

Dr. Burney aired his theories during the Tenth Annual Sea Turtle Conference at Hilton Head Island, SC, February 20-24, in a paper entitled "The Relationship of Loggerhead Nesting Patterns and Moon Phase in Broward County, Florida." Co-authors are **Cathy Mattison** and **Louis Fisher**, of the Broward County Environmental Quality Control Board. The paper was extremely well received.

CENTER JOINS NOVA'S 25TH ANNIVERSARY CELEBRATION

Nova University celebrated its 25th anniversary in 1989. It was a happy year, during which the hard times were all but forgotten and the many good times that our young university has experienced since 1964 took a front seat. In a novel approach to a year-long celebration, each month "belonged to" a particular center. December was our month.

Our celebratory gift to the University was launched during the first week of December. Early on, Center Director **Dr. Julian McCreary** decided that the best way to show the entire University how we as a center, and oceanography as its discipline, have progressed over the years would be to present a series of seminars on different aspects of oceanography.

We chose to hold the talks at Nova's main campus, 15 miles inland from our turf, so that the audience could slip into the auditorium and brown-bag with us during the lunch hours. It worked, and our speakers were very well received.

On the first day of the 3-day seminar period, the speaker was **Dr. Otis Brown**, of the University of Miami, who is one of the nation's leading experts on satellite oceanography. He spoke about the many facets of studying the world's oceans from space, from determining wave height and therefore wind speed to locating marine biomass and associated fisheries. Dr. Brown has interacted with members of our faculty many times in the past, and his work continues to be of interest to both physical oceanographers and marine biologists.

On December 6, marine biologist **Dr. Charles Messing** gave us a fascinating slide presentation entitled "Beneath Crystal Seas: A Half-mile Down in the Bahamas." We were treated to photos of weird and sometimes bizarre deep-water fishes and assorted flora and fauna. *Bathynomus giganteus*, the creature shown on this page, is an example of what one might find at a depth of several thousand feet in the tropical West Atlantic Ocean (given the use of a deep-diving underwater vehicle, of course, as was Dr. Messing). Commonly known as a giant deep-sea pill bug, the critter actually is an isopod crustacean, not an insect, belonging to the same group of animals as the "boat roaches" found on sidewalks and seawalls, and wood lice. Since the pill bug is not found in water shallower than 500 feet, fortunately there is scant chance of running into one while diving.

Alas, poor Bathynomus. I knew him....

On December 7, Center adjunct **Capt. Peter Throckmorton**, who has been dubbed the "Father of Marine Archaeology," spoke on "Maritime Archaeology: The Real Treasure in Shipwrecks." Last year he published a volume on the subject and is nearing completion of a second book, entitled *All the Men in Her*. He described some of his more memorable experiences with old vessels and shipwrecks from the standpoint of a scientist, as opposed to a treasure-hunter.

The Center rounded out the week by hosting an open house on the afternoon of December 8. The intent was to show the staffs of other centers of the University what our laboratories and other work areas are like. We had an excellent turnout. Several Coastal Studies students volunteered to lead tours through our buildings, where faculty and staff members explained their research activities. The wine and cheese tables turned out to be popular attractions, as was the houseboat, where faculty, student, and administrative offices are located. And yes, Virginia, we really were moving with the tides and currents!

PROFILE

CENTER'S "OLDEST" STAFF MEMBER HAS MANY STORIES

Laszlo Nemeth, behind experimental weather station.

Laszlo Nemeth is not the oldest staff member chronologically, only in terms of tour of duty. He was, in fact, with Nova at its inception. In 1965 he joined the staff of **Dr. Ray Pepinsky**, who headed Nova's solid state physics laboratory and whose specialty was crystallography. Laszlo was in charge of the lab, and he spent one year "growing" crystals from chemicals.

Then in 1966 **Dr. William Richardson** happened onto the Nova scene and started what was then called the Physical Oceanographic Laboratory. Its home was a 2-story houseboat (which remains our home) docked at the tip of SE 15th St. in Fort Lauderdale. The research vessels, the trailers, and the leased aircraft came later. It did not take Laszlo long to ship on, and he immediately became an invaluable cog in the young laboratory's machinery.

Dr. Richardson's work in physical oceanography was unique and highly innovative. One of Laszlo's first jobs was to build a free-fall underwater camera, which was a new concept in current studies. He also became a specialist with the Richardson STD probe, which recorded salinity, temperature, depth and current data. The probe was dropped over the side of the boat instead of being tethered to cables, and it became the first free-fall STD to be used in the oceanographic community.

Soon to follow was another innovative current-measuring device: the air-dropped XBT (AXBT). At the time, in the early 1970's, the Lab leased an aircraft and modified it to suit Dr. Richardson's purposes. Behind the cockpit, a sophisticated camera mounted in a glass floor panel pointed straight down at the sea. [Sitting backwards in the plane and hovering over that glass bottom was rather exciting, as this writer recalls.] The probe was ejected from a candy-striped pipe extending from the aft portion of the plane. On impact with the water, a patch of dye was emitted from the probe. When the probe surfaced, 3 more dye patches were emitted. As the plane looped around and flew over the dye patches, the camera recorded the distances between them. In this way, the current speed and direction could be calculated. Laszlo's work included development of the camera mount, the probe, and the film sequences, as well as much of the data interpretation. Our researchers were the first to use XBT's dropped from aircraft, and today the technique is commonplace.

January of 1975 marked the lowest point in the Lab's history. Dr. Richardson, along with a crew of 4, was lost at sea while working on a drifting buoy project out of Boothbay Harbor, Maine. Gone too was our research vessel, R/V *Gulf Stream*, as well as the spirit of the Lab.

Laszlo and the remaining staff worked almost aimlessly for awhile, then dug in with a determination that surprised even themselves. New projects emerged, one of which was headed by **Dr. Mark Wimbush**, now of the University of Rhode Island. He needed an expert in underwater photography, and the logical person to turn to was Laszlo. The experiment involved photographing deep-water sand ripples, in order to learn more about currents in relation to sand drift. An extensive experiment in the Florida Current, headed by **Dr. Irving Brooks**, also availed itself of Laszlo's at-sea talents.

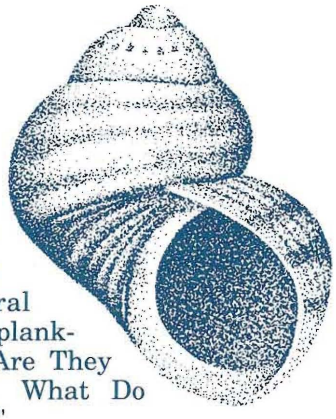
Taking time out when funds were scarce, Laszlo drifted south in 1980 to the Rosenstiel School of the University of Miami, where he worked for 5 years as a technical designer of oceanographic instrumentation (and still does, on a part-time basis). Fortuitously, in 1985 **Dr. Russell Snyder**, who had just returned from 5 years of cruising around the world in his home-made ketch, received long-term funding from the National Science Foundation to perform gravity wave studies in the Abacos. Laszlo of course was more than willing to return to the Lab (renamed the "Center") to help Dr. Snyder develop a complex wave-monitoring array, and to manage the machine shop for other research projects as well. The beat goes on.

This small capsule brings us to the present, but what of Laszlo's "other life," before the Lab? Briefly, he grew up in Hungary and he walked out of his homeland in the midst of the 1956 Soviet repression. Rather, he made his way past the tanks and patrols and crawled under a fence to safety in Austria. His most vivid memory of his brief stay in Austria immediately after the escape was a chance encounter with a distinguished gentleman in shiny black shoes who emerged from a limo into a muddy field. The gentleman shook hands with Laszlo and said something unintelligible in English that unfortunately was lost on him. The gentleman was then-Vice President **Richard Nixon**.

It took only a month for the enterprising Mr. Nemeth to alight in the U.S. - and to work in a laboratory at Penn State with Dr. Pepinsky! Laszlo accompanied Dr. Pepinsky to FAU in Boca Raton and then on to Nova. And thus we have come full circle.

Of the Oceanographic Center as it exists today, Laszlo remarks that he relishes "the surroundings, the laid-back atmosphere." As for recent events in Hungary and the rest of Eastern Europe, he comments that "things are taking place now that I was fighting for in 1956 and didn't happen. These are the things that I dreamed would happen. If they had, I wouldn't be here now."

PEOPLE ON THE MOVE



Dr. Richard Dodge attended a conference in Tampa, January 17-19, on Geological Indicators of Marine Climate. He presented a paper entitled "Some Statistics of High-latitude Coral Bands."

On January 25, Ph.D. candidate **Denis Frazel** left for Tahiti, where he joined a cruise on NOAA (Miami) research vessel *Malcolm Baldridge*. He is working on a project entitled NOAA RITS (Radiatively Important Tracer Species), in which scientists are studying the tropical Pacific ozone minimum in a region between Tahiti and Samoa. He returned from Samoa on February 25.

Dr. Gary Kleppel visited the School of Oceanography at the University of Washington in Seattle, February 1-6. He worked on his NSF research on microzooplankton with **Dr. Evelyn Lessard**. He also presented a seminar entitled "The Natural Diets of Zooplankton: How Are They measured? What Do They Mean?"

During February 12-14, **Dr. Gary Kleppel** attended the annual Ocean Sciences meeting, sponsored by the American Geophysical Union, in New Orleans. He spoke at a special session on Rates and Automated Sampling of Zooplankton Abundance; the title of his talk was "Food, Diet, and Egg Production of Copepods." M.S. student **Carol Reese** also attended the meetings.

Dr. Richard Dodge traveled to Bermuda during February 12-15. He provided input for a possible joint environmental monitoring project with the Bermuda Biological Station and the Danish Water Quality Insititute.

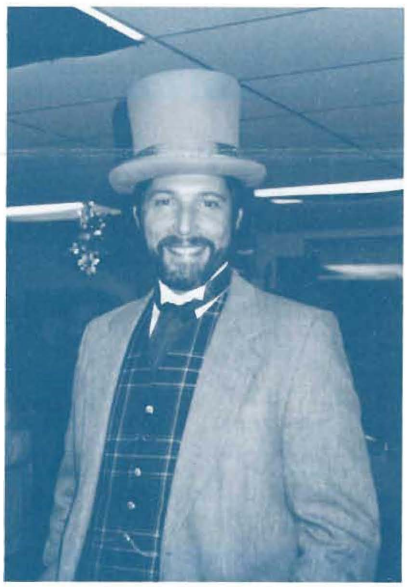
Captain Peter Throckmorton, Center Adjunct, traveled to Tucson, Arizona, January 10-14 to attend a meeting of the Council for Underwater Archaeology, sponsored by the Society for Historical Archaeology. He presented a talk entitled "The Worst Investment in the World," which treated the rather explosive question of whether archaeologists should work with treasure hunters.

Dr. Curtis Burney and M.S. student **Cathy Mattison** traveled to Hilton Head, South Carolina, during February 20-24 to attend the 10th Annual Sea Turtle Conference. Dr. Burney presented a paper entitled "The Relationship of Loggerhead Nesting Patterns and Moon Phase in Broward County, Florida," co-authored by Ms. Mattison and **Louis Fisher**, of the Broward County Environmental Quality Control Board.

During the period April 1-30, **Dr. Kleppel** will be a Visiting Scientist at the Georgia Marine Institute, Sapelo Island.

Enjoying the festivities are Mr. Richard Miller, V.P. for Development; Dr. Julian McCreary, Director; Dr. Charles Forman; and Dr. Richard Dodge.

Dr. Russell Snyder, center, joins the musicians in the spirit of Christmas.



Dr. Charles "Dickens" Messing.

HOLIDAY PARTY A SUCCESS

The Center's annual holiday party attracted a large crowd and all were royally fed and entertained. For those who managed to stray from the food table, which was highlighted by two 6-foot-long hoagies, there was live music in the library. Two excellent local instrumentalists were joined occasionally by some of our staff who have musical bents, to the delight of the audience. Happily, many members of the university's administrative staff were in attendance, as well as some of our benefactors and Friends of the Oceanographic Center.

UNDERCURRENTS
INSTITUTE OF MARINE AND COASTAL STUDIES

SPOTLIGHT

COPEPODS BECOME FOOD FOR THOUGHT

Dennis Seymore, an M.S. student in Marine Biology, has chosen tiny copepods and their egg-producing habits as a thesis project. Working under faculty adviser **Dr. Curtis Burney**, Dennis is using a common estuarine copepod species found in tropical and temperate waters in his laboratory experiments.

He is attempting to relate the nutritional quality of particular phytoplankton to both copepod feeding and egg production. He wants to determine whether the quality of the food ingested is a limiting factor.

To begin his experiment, Dennis extracted copepods from the nearby waters of Port Everglades. He then sorted out all the females by determining, under the microscope, which ones were gravid, or "with eggs." He let these females acclimate to a new, artificial food source for 48 to 72 hours. Then 10 copepods were placed in each of 8 bottles for a period of 24 hours. Four pairs of bottles contained different concentrations of food. At the conclusion of this time period, the copepods were filtered off to new homes. The remainder of each sample, the part containing the eggs, was fixed with formalin and rose bengal, a dye that stains the eggs for easy identification.

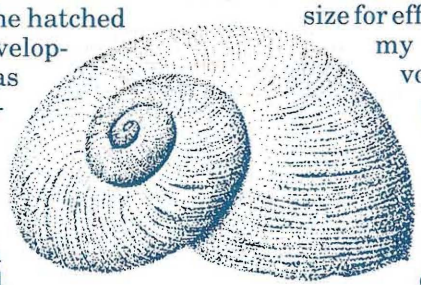
Then came the part requiring good eyesight. All of the eggs from each sample were counted, and the hatched eggs separated from the developing eggs. This procedure was done under a dissecting microscope.

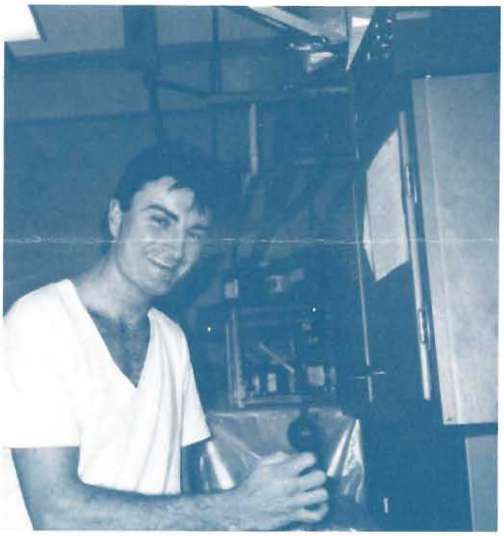
Hopefully, the experiment will show that when the food introduced was nutrient-replete (healthy), high egg production rates resulted. By the same token, lower egg production rates should be seen in the copepods that were given nutrient-deficient food. "If I see these results," Dennis explains, "then I feel that I can relate egg production to the nutritional quality of the food."

And how does this knowledge fit into the scheme of things? "The overall picture," Dennis responds, "is that the phytoplankton biomass in tropical and temperate waters increases, or blooms, when there are appropriate nutrients available as well as sunlight for photosynthesis."

He explains that in the real ocean, phytoplankton blooming can be seen to increase seasonally, in the spring and fall. "Once it has reached a certain concentration, the phytoplankton deplete the nutrients. Nitrogen normally is the limiting ingredient. The effect of nitrogen is that it limits the reproduction capabilities of the phytoplankton, causing the biomass to begin to decrease in relation to such variables as the depleted nutrients, grazing, sedimentation, and advection of water parcels.

"What I'm looking at is the grazing. There is a lag time between the phytoplankton bloom and the onset of a zooplankton biomass increase. This increase is associated with high-quality food, abundance, and appropriate food size for efficient filtering. So my experiment revolves around using phytoplankton during and then after the bloom, once the nutrients have been taken out, or depleted.





Dennis Seymore in the laboratory.

"The broad scope of my study is to learn whether these animals are able to reproduce while feeding on foods of low nutrient quality. If they are, I'm assuming they will be able to sustain the biomass. If not, my hypothesis is that food of low nutrient quality will not sustain production. One of the variables that I am *not* looking at is predation. Zooplankton take the phytoplankton (primary producers) and transfer that nutritional energy up to the next level of the food web - the larval and juvenile fish.

"The final stage of my experiment is CHN (carbon/hydrogen/nitrogen) analysis, which, hopefully, will show the ingestion and production responses to food sources of different qualities." Ultimately, Dennis must rely on a machine to sort out the data and determine the relative success of his experiment.

Dennis hopes to be finished with his laboratory work by this summer. He would like to go on for his Ph.D., but at this time he is unsure of his plans. For one thing, he would like to have a "real" job. Having a wife and two small children may have some influence on his final decision.

HULL BECOMING A VESSEL

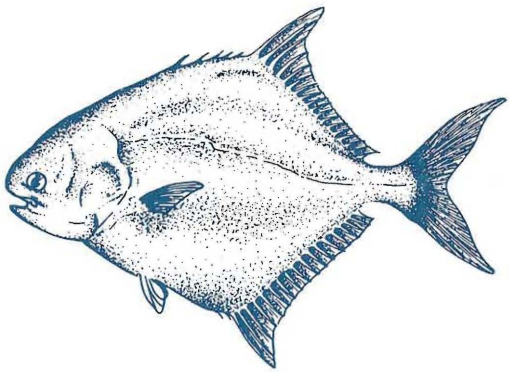
Thanks to generous contributions from several sources, our research hull is beginning to resemble a research vessel. After having received a bare U.S. Navy surplus hull by way of the National Science Foundation last summer, **Drs. Richard Dodge** and **Gary Kleppel** have been hard at work finding donors to shape up the vessel. We are happy to list some impressive successes since our last report.

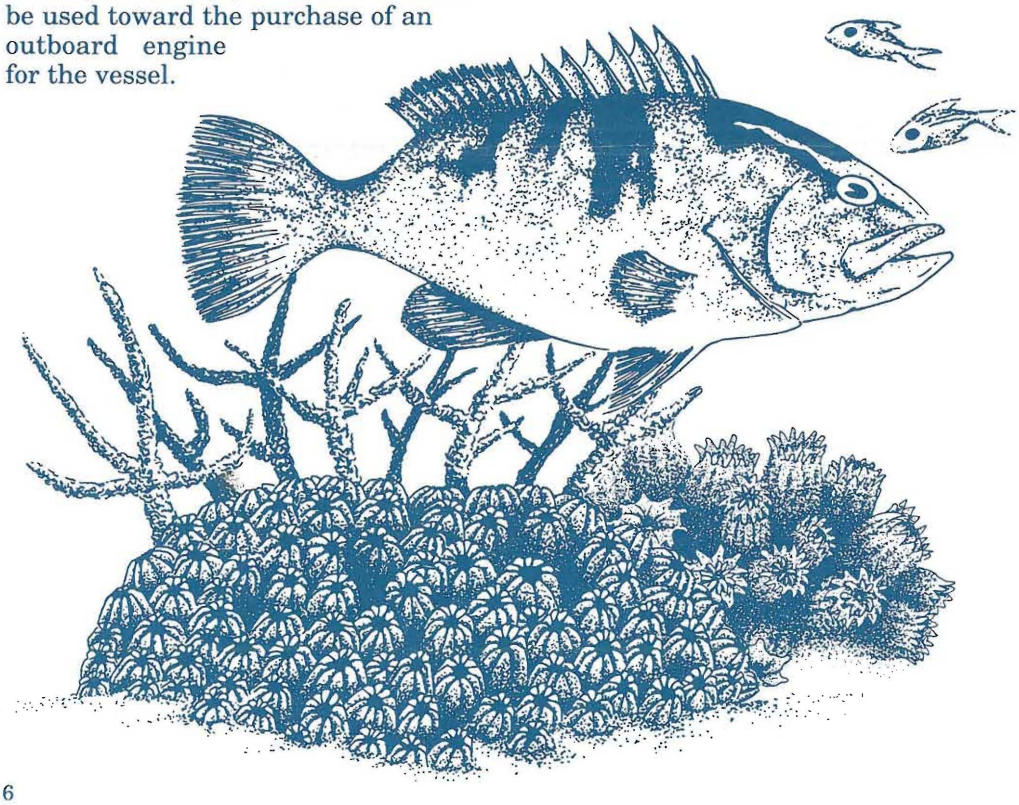
At a ceremony on January 4, **Mr. John Penn**, President of The Marine Industries Association of South Florida, presented a check in the amount of $10,000 to the Center to help with the refurbishment of the 22-foot Boston Whaler. **Mr. Van Snider**, Executive Director of the 500-member Association, remarked that "We think there are a number of research projects underway at Nova University's Oceanographic Center that are beneficial and of interest to the community.... Our organization believes that we should give back to our community by supporting research that will enhance our environment." **Mr. James Bleech**, Vice President, also participated in the ceremony.

The South Florida Fishing Classic, an annual tournament dedicated to improving the future of saltwater fishing while providing fun for the fishermen, donated $5,000 to the Center to be used toward the purchase of an outboard engine for the vessel.

Dr. Charles and Lucy Forman have donated $2,000 toward the purchase of an outboard engine as well. Over the years, the Formans have been consistent donors to the Center and ardent friends and supporters. We are very appreciative.

Pipe Welders of Fort Lauderdale has pledged a full T-top, and **Boston Whaler** itself plans to donate all the "Whaler bits." The Oceanographic Center would be most grateful for additional donations. Those wishing to donate boat gear or equipment may call Dr. Dodge or Dr. Kleppel at (305) 920-1909 for further information. Cash donations also are gratefully accepted and will be especially important for maintaining and running the vessel.





CLASS SCHEDULE FOR SPRING

Spring term classes at the Oceanographic Center begin on April 2 and continue to June 22. Specialties are *Marine Biology* and *Coastal Zone Management*. Courses may be of interest for teacher recertification or for audit. Each course is for 3 hours credit. Tuition is $225/credit hour (50% less for audit). Each class meets once per week from 6:30 to 9:30 PM. For further information and applications, contact Dr. Dodge, Dr. Burney, or Ms. Mattison at (305) 920-1909.

ASPECTS OF MARINE POLLUTION (CZM-790): Offered as an elective for both specialties, the course covers fundamentals of coastal pollution, concentrating on effects of pollution on marine life, monitoring methods, and interpretation of laboratory results. Instructor: **Dr. Donald McCorquodale** (Center Adjunct). Begins Monday, April 2.

TROPICAL MARINE FISH ECOLOGY (OC-6120): Involves aspects of tropical fish ecology including estuarine, mangrove, reef, and pelagic environments. Community structure, ecology, reproduction, and behavior are discussed. A field trip in the Florida Keys will utilize methodologies of fish population assessment. Snorkeling is necessary, SCUBA is suggested. Instructor: **Dennis Landmeier** (Center Adjunct). Begins Tuesday, April 3.

MARINE GEOLOGY (OC-5604): A CORE course for both degree programs. Topics range from fossil reefs to mid-ocean ridge basalts. Southeast Florida geology will be included. Instructor: **Dr. Pat Blackwelder** (Center Faculty). Begins Wednesday, April 4.

WETLANDS ECOLOGY (CZM-791): Basic ecology of coastal (marine and fresh water) wetlands is covered, followed by intensive field work on: identifying wetland indicator species; techniques of wetlands agency delineation based on vegetation, soils, and hydrology; evaluation of the functions of the wetlands. Field work will require a minimum of four Saturdays (in lieu of evening lectures). Instructor: **Dr. Bart Baca** (Center Adjunct). Begins Thursday, April 12.

FRIENDLIES VISIT BASIN

Mother and baby vie for a deep swig of fresh water from the hose.

'Tis the season. Seeking warm water, as well as appetizing flotsam, many charming manatees once again found refuge in the Center's boat basin this winter. On separate occasions, two exceptional mother-daughter (-son?) teams attracted considerable attention around the seawall. Our favorite game (before water restrictions) was hanging a spouting hose over the side and watching these shy but sociable mammals drink from (actually suck) the nozzle. Although they live in salt water as well as brackish or fresh-water canals, they seemed to crave long doses of the fresh stuff. They also liked our lettuce treats, but didn't care much for cabbage.

One of the friendlies.

MONITORING OF RENOURISHMENT PROJECT CONTINUES

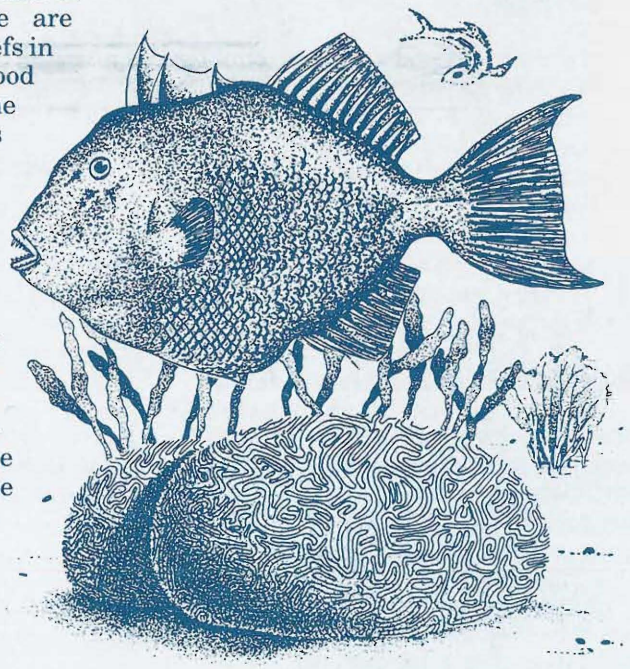
The Summer 1989 issue of *Currents* contained an article describing the beach renourishment project at John U. Lloyd Beach State Park in Hollywood. **Drs. Richard Dodge** and **Charles Messing** have been funded by Broward County to monitor the project. **Dr. Steven Hess**, Nova Adjunct Professor and Senior Scientist at ERM-South, Inc., also is involved in the work. Reef quadrats and transects were analyzed and sediment cores were collected during the first phase (predredging) in February/March 1989. The second phase began a month following the completion of dredging, in August/September. Results are now coming in.

According to Dr. Messing, there has been "a tremendous increase in the amount and diversity of filamentous algae on the reef quadrat sites." He also noted "a considerable increase in the number of sponges at several stations." Because the increases were apparent at control stations ostensibly unaffected by the dredging, as well as at stations near the dredge and fill sites, they are most likely seasonal effects. Summertime increases in algae are typical of coral reefs in general. The good news is that he found "no obvious negative dredging effects."

Concerning the analyses of sediment core samples, Dr. Messing reports that "identification of small invertebrates extracted from the predredging phase is almost complete. Over 2000 specimens represent almost 250 species, of which nearly one-half are segmented polychaete worms. The material includes representatives of several new species, including a particularly fuzzy amphipod crustacean (*Haustorius n.sp.*) and a solitary, wedge-shaped coral (*Sphenotrochus n.sp.*) that looks like a tiny white piece of candy corn. This coral starts out by attaching to an individual sand grain. As it grows, it surrounds the grain and lives unattached on the sandy bottom."

As for the specimens from the second phase of sediment sampling, they have been sent out to experts for final identification. Outside institutions include the Smithsonian, Mote Marine Laboratory, RSMAS at the University of Miami, the University of Maine, and Harbor Branch Institution. According to Dr. Messing, "there have been some clear changes, including significant and sometimes enormous increases in numbers of Nemertea (ribbon worms), Nematoda (roundworms), and harpacticoid copepods, but we won't know the details for awhile."

The final reef sampling will take place one year after completion of the dredging, which will come up in July. Stay tuned.



NOVA UNIVERSITY
25th ANNIVERSARY

Currents, Winter 1990
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